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Alexander Holley and the Makers of Steel. Jeanne McHugh. Johns Hopkins University Press, Baltimore and London, 1980. Pp. xiv+402. Index. One of a series of Johns Hopkins studies in the History of Technology. \$27.50

The last half of the nineteenth century was a period of tremendous change in the engineering world. Many of these changes involved new materials and none was more important than steel. The secret of the widespread use of steel, particularly in rails for the new railroads, was the ability to produce large quantities with uniform quality at a price competitive with wrought iron. Few of us realize how complex this development was: for example, it took ten years from the date of Bessemer's famous patent for the first successful Bessemer converter to make its initial 'blow' in the USA.

In the meantime, Kelly, Goransson, Mushet, Siemens, Martin and dozens of other lesser-known engineers, chemists, metallurgists and businessmen tried frantically to adapt the process for different ores and to produce a wider range of steels. Jeanne McHugh makes a valiant attempt to weave together the story of the life work of these men from six different countries on two continents and, for the most part, succeeds.

While the author chose Holley as the central figure, this is much more than a biography. It is primarily the story of the adaptation of the Bessemer process in the USA. In the early chapters, she outlines the background of the main figures, their education, training and their major contribution to the production of steel. Alexander Holley is the man who perseveres in mastering what was known about the Bessemer technique in England and, acting as a consulting engineer, designed the first successful steel plants in America. To the author, Holley is a paragon, who not only is a genius at selecting the best techniques from each

inventor but is also an outstanding author, orator and benefactor of society. This hero worship is perhaps easier to understand when one considers such contemporaries as Andrew Carnegie.

Actually, the story thus far is well told. The detail, the research and references are impressive. The individual life histories are woven together with skill even though the author does burden us occasionally with tiresome minutiae of family relationships. The book then begins to trail off. The author mentions the open hearth process in a casual way quite unlike the first part, even though Holley was a staunch advocate of the process. The final years of Holley's life are described without much reference to the technology of steel.

McHugh deals with the mechanical technology of steel production very competently and should be readily understood by our readers. However, her treatment of the chemistry and metallurgy of steel is very brief and hesitant. One very curious omission is that there is no definition of steel anywhere in the book. Nor does she tell us how any of these men knew when they had produced steel except by rough testing its mechanical properties. She never mentions high carbon or low carbon steels and only in passing does she mention heat treatment. Anyone who is interested in structural steel will find the story incomplete. Overall the book is a useful, well-researched reference work on the Bessemer process.

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